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Editorial

The fight against infectious diseases begins anew

Microbial pathogens are raging a new battle in the 'human health wars'. The World Health Organisation highlighted the global burden of infectious gastrointestinal disease continues to increase, a problem that is most acute for children under 5 years old and persons living in low-income regions of the world. Scientific research into enhanced diagnostics and treatment options of these diseases has never been more prominent than now. In this issue, we discuss the advances in diagnosis methodologies, the growing threat of Antimicrobial Resistant (AMR) infections and an alternative AMR therapy, and the latest development for modelling enteric diseases and evaluating treatment options.

We begin this issue with Hijjawi summarising and discussing diagnostic advances for *Cryptosporidium* infections at Point of Care facilities (pp. 000). *Cryptosporidium* is endemic in low-income countries, where poor sanitation networks and unhygienic drinking water contribute towards the transmission of this pathogen. It is in these settings where quick and accurate diagnosis can lead to effective treatment, thus, preventing disease outbreaks and limiting the health impact of this pathogen on susceptible populations. Hijjawi discusses the drawbacks in current microscopy detection methods, and follows this up with molecular approaches, such as Isothermal Amplification methods and CRISPR-Cas diagnostic technologies. This section is rounded off by considering the challenges that still remain in the development of Point of Care diagnostics and thoughts on the future directions. One of the things the COVID-19 pandemic has highlighted, is that rapid, accurate, and cheap diagnostic tools can be achieved.

As the leading cause of bacterial gastroenteritis, *Campylobacter* is estimated to cause 550 million infections per year world-wide, and sometimes severe post-infective complications such as reactive arthritis and Guillain-Barre syndrome. In their review, Qin, Wang, and Shen (pp. 000) discuss the adaptive mechanisms for antibiotic resistance observed in *Campylobacter* species, trends in human and animal antibiotic resistance rates, and the growing issue of multidrug resistant *Campylobacter* infections. Antibiotic resistant (AMR) *Campylobacter* is a global problem, affecting over 39 countries, with sources of AMR *Campylobacter* found in livestock, the environment, and food – an example of a One Health problem. The range of antimicrobial resistance determinants observed in *Campylobacter* were not only against those typically used to treat Campylobacteriosis, like quinolones and macrolides, but to unrelated antimicrobials as well, like phenicols. This article joins many of those calling for strategies to combat *Campylobacter* on a One Health scale.

The global prevalence of AMR is increasing and set to cause more deaths than cancer by 2050 (O'Neill, 2014). The World Health Organisation report on AMR in European countries estimated that there were 541,000 deaths in 2019 associated with bacterial AMR (Mestrovic, 2022). AMR is a multifaceted problem that will require novel solutions; Faecal Microbiota Transplants (FMT) has been proposed to help reduced the carriage of AMR in humans. In the review by Suez (pp. 000), he discusses the efficacy of FMT to reduce AMR carriage. Recent clinical trials have examined FMT efficacy in participants with different gastrointestinal conditions, with or without antibiotic usage. Suez discusses some of the risks associated with FMT therapy, and some considerations for future clinical trials to address the heterogenicity in response, safety, and efficacy for resistome amelioration.

Another gastrointestinal infection strongly associated with the use of antibiotics is *Clostridioides difficile* infection (CDI), the most common cause of healthcare-associated diarrhoea. CDI occurs

when the microbiota are perturbed, such as antibiotic therapy; however, much of the pathogenicity of this micro-organism is unknown, and effective treatment options are lacking. Ewin, Davis Birch, and Moura discuss the recent advances of *in vitro* models that simulate the colonic environment to study *C. difficile* pathogenicity. Here the authors discuss the advantages and limitations of current models to study *C. difficile* kinetics, pathogen-host responses, and pathogen-microbiota interactions. The authors present their views on the future of *C. difficile* models, where improvements in modelling the complex physiological conditions of the human digestive system can extend their reflective *in vivo* nature, which has implications for other gastrointestinal diseases.

References

O'Neill, J. 2014. Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations. The Review on Antimicrobial Resistance, 20, 1-16. https://wellcomecollection.org/works/rdpck35v

Mestrovic, Tomislav., Robles Aguilar, Gisela., Swetschinski, Lucien R., et al. 2022. The burden of bacterial antimicrobial resistance in the WHO European region in 2019: a cross-country systematic analysis. *The Lancet Public Health*, Volume 0, Issue 0 https://doi.org/10.1016/S2468-2667(22)00225-0